North American Rapid Refresh Ensemble (NARRE) at the HMT-WPC Winter Weather Experiment

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ABSTRACT

The main focus of the Weather Prediction Center (WPC) Hydrometeorology Testbed (HMT) has been the acceleration and implementation of new technologies and research enhancements into WPC products and services. One of the experimental activities organized by WPC is the Winter Weather Experiment (WWE). The fifth annual HMT-WPC Winter Weather Experiment has been ongoing since January 21, 2015, and will continue for one month. The focus of the experiment continues to be an evaluation of microphysics-based snowfall forecasting methods for operational and experimental deterministic and ensemble forecasting systems. This year, the pre-NARRE configuration has been included in the WWE. The focus of the pre-NARRE effort is to work toward the development and implementation of the hourly updated North American Rapid Refresh Ensemble (NARRE) forecasting system. This new system is planned for implementation into NCEP operations as an extension of the Short Range Ensemble Forecasting (SREF) system in 2017. This new system will provide improved probabilistic forecasts for aviation and other short-range applications. The work is conducted collaboratively by the GSD, EMC, and DTC staff.

For initial testing, the Rapid Refresh (RAP) domain is being used, but in a later phase, the domain will be slightly enlarged. Configuration tests have been performed in retrospective mode. The tests included eight ensemble members, four using the Advanced Research WRF dynamic core and four using the Nonhydrostatic Multiscale Model on the B grid (NMMB) dynamic core. The ARW core members employed variations in physics and initial and lateral boundary conditions, while the NMMB members differed only in initial and lateral boundary conditions. The chosen baseline pre-NARRE configuration is illustrated in Table 1. This configuration has been running in real time since November 15, 2014 to supply datasets for the HMT-WPC WWE. As a part of the WWE, pre-NARRE has been evaluated alongside operational and experimental versions of SREF. Summary of the WWE findings will be presented at the workshop.

Table 1. The pre-NARRE configuration employed in the 2015 HMT-WPC Winter Weather Experiment.

	MP	Sfclay	Sfcphy	PBL	CU	IC/LBs
rap	Thompson	MYNN	RUC	MYNN	GF	GFS
rap1	Thompson	MO-MYJ	RUC	MYJ	BMJ	GEP01
rap2	Ferrier	MO-MYJ	RUC	MYJ	BMJ	GEP02
rap3	Ferrier	MYNN	RUC	MYNN	GF	GEP03
nmb	Ferrier	MYJ	NOAH	MYJ	BMJ	GFS
nmb1	Ferrier	MYJ	NOAH	MYJ	BMJ	GEP01
nmb2	Ferrier	MYJ	NOAH	MYJ	BMJ	GEP02
nmb3	Ferrier	MYJ	NOAH	MYJ	BMJ	GEP03